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SERIES 78

Dr. Kyosuke Yamamoto

Series – 78

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Venue : [Zoom](#)

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Changes in population, community and evolutionary dynamics of pathogenic bacteria driven by interspecies interactions

Most microbes coexist with distinct species in their natural habitats, forming microbial communities. Among members of microbial community, a variety of interspecies interactions affect phenotypes of interacting species and hence community dynamics. Moreover, such interspecies interactions can be a driving force for adaptive evolution of interacting species. As for pathogenic bacteria, polymicrobial infection is often observed, and competitive and cooperative interactions among pathogens would affect their phenotypes related to pathogenesis. Therefore, interspecies interaction would be a key factor for better understanding of not only population dynamics but evolutionary dynamics of pathogens during infection process, which would give us a hint to control infection and pathogenicity.

In this seminar, I will introduce my research on opportunistic pathogens *Pseudomonas aeruginosa* and *Staphylococcus aureus* that are ubiquitous in human and natural environments and notorious as a cause for serious clinical issues (e.g., chronic infection, nosocomial infection). They often coexist in infected sites, and the interactions between them affect various phenotypes each other including biofilm formation, virulence etc. Notably, even antibiotic resistance can be conferred by interspecies interaction despite the absence of antimicrobial drug. However, these phenotypic changes are temporal, and it is still largely unclear how these interactions confer heritable phenotypic changes (genetic changes). I have focused on the influence of interactions between them to evolution and investigated adaptive evolutionary dynamics of these pathogens by laboratory evolution experiment. Phenotypic and genomic analyses revealed the evolved traits in the interaction with cohabiting pathogen, and it indicated that the interactions drive adaptive changes of both strains that affect their antibiotic resistance and expression of virulence factors.